

REMARKS

Favorable reconsideration of this application in view of the remarks to follow is respectfully requested.

In the present Office Action, Claims 1-10 and 28-30 stand rejected as allegedly obvious, under 35 U.S.C. §103(a), over the combination of the article to E.M. Kakuno, et al. entitled "Structure, Composition, and Morphology of Electrodeposited $\text{Co}_x\text{Fe}_{1-x}$ Alloys", J. Electrochemical Soc., Vol. 144, No. 9, September 9, 1997, pp. 3222-3226 ("Kakuno, et al.") and U.S. Patent No. 4,695,351 to Mallary. Claims 1, 29 and 30 stand objected to because of minor informalities.

Claims 1, 29 and 30 have been amended to correct the spelling of the term "Telsa" to "Tesla". In light of the amendments to Claims 1, 29, and 30, applicants submit that the objection to Claims 1, 29 and 30 has been obviated.

In the present Office Action, the Examiner avers that the previously submitted 1.132 Declaration of Hong Xu was defective because:

1. The alloy compositions were not indicated for the loops depicted in Exhibit 1;
2. The applicants allegedly failed to indicate the composition of the inventive sample recited on page 7, 4th line from the bottom of the page, or the process for making the inventive sample;
3. The Examiner argues that since applicants anneal the Kakuno, et al. alloy films, as discussed on page 7 of the previously submitted Declaration; the annealed films allegedly do not exemplify the composition produced by the

Kakuno, et al. process. The Examiner further alleges that applicants failed to indicate the reason for heating the Kanuno, et al. alloy films;

4. The Examiner notes that applicants have allegedly not indicated how the Fe60 and Co40 film, recited on page 9 of the previously submitted Declaration, was produced.
5. The Examiner alleges that it is not clear how the films measured in the ESCA profiles represent the inventive alloy or the alloy produced by the Kakuno, et al. process. The Examiner alleges that the alloy measured in the ESCA profiles is a Co-Fe-Rh alloy film; and
6. The composition of the inventive alloy and Kakuno, et al. alloy referred to throughout the Declaration and the process of making those compositions was unclear.

In view of the above defects in the previously submitted §132 Declaration, applicants submit herewith a new §132 Declaration.

The newly submitted Declaration is believed to overcome the defects mentioned in the Office Action. Each of the above alleged defects in the previously submitted § 1.132 Declaration will now be addressed. First, referring to the paragraph bridging pages 8-9 of the newly submitted Declaration, the Declaration has been amended to define that Loop 1 represents a CoFe film produced by the Kakuno, et al. process comprising 43 wt % Fe; Loop 2 represents a CoFe film produced by the Kakuno, et al. process comprising 64 wt % Fe; Loop 3 represents a CoFe film produced by the Kakuno, et al. process comprising 76 wt % Fe; and Loop 4 represents a CoFe film comprising 76

wt % produced by the inventive process. This obviates the first defect mentioned above in the present Office Action.

Secondly, applicants have indicated in section (9) of the newly submitted Declaration that the compositions of the Kakuno, et al. film, depicted in Exhibit 3, and the inventive film comprises 64% Fe and is produced in accordance with the process conditions described in sections (6) and (7) of the new Declaration. Hence, the second deficiency in the previously submitted Declaration has been overcome by the revisions in the newly submitted Declaration.

The new Declaration also indicates that the Kakuno, et al. films were annealed to depict the effect of the higher concentration of defects in the films produced by the Kakuno, et al. process. The Kakuno, et al. process produces films having a higher oxygen and nitrogen content than the inventive process. The impurities in the film affect the film's physical properties during annealing. The Kakuno, et al. films were annealed to prove that the films produced by the Kakuno, et al. process had a higher impurity concentration than the inventive process. The annealing step was conducted following the deposition of the Kakuno, et al. film. Therefore, annealing the Kakuno, et al. films did not affect the Kakuno, et al. deposition process. The newly submitted Declaration obviates the third deficiency noted above.

Insofar as the compositions of the ESCA profiles are concerned, applicants observe that the title of the ESCA profiles indicates that a CoFe film is deposited on a Rh substrate. The ESCA profile is not an Co-Fe-Rh alloy as suggested by the Examiner. The composition of the CoFe film comprises about 60 wt % Fe and 40 wt % Co. Hence,

the fifth deficiency in the previously submitted Declaration has been overcome by the in the newly submitted Declaration.

To obviate the defect under item 6 of the Office Action, the composition of the inventive film and the process for forming the inventive film has been included in section (6) of the newly submitted Declaration. Applicants further note the Declaration as a whole has been amended to indicate the composition, and method of making, the inventive and Kakuno, et al. films. This material added to the new Declaration is believed to overcome the defect under item 6.

Lastly, the newly submitted Declaration explains what data is generated, the significance of the data and how the data distinguishes the claimed invention from the prior art. Referring to sections (5), (9), (10) and (11) of the newly submitted Declaration, the experiments of the Declaration were performed to show differences between the inventive CoFe film and a film that was reproduced in accordance with the disclosure of Kakuno, et al. The table in section (7), which is provided in the Declaration, illustrates that the same plating set-up as disclosed in Kakuno, et al. was used as well as the same substrates for plating. The film composition, magnetic moment resistivity and B-H loops of the film prepared in accordance with the Kakuno were measured and compared to the CoFe film of the present invention. The oxygen and nitrogen concentration in the plated films were also measured and a comparison was made.

Applicants respectfully submit that all of the deficiencies in the previously submitted Declaration have been overcome by the present submission.

Turning to the rejection of Claims 1-10 and 28-30 under §103, applicants respectfully submit that the claims of the present application are not obvious over the combination of Kakuno, et al. and Mallary, since the prior art references do not teach or

suggest applicants' claimed *cobalt-iron binary alloy electroplated film which has a saturation magnetization of at least about 2.30 Tesla, is substantially free of oxygen and iron oxide, anisotropic and consisting of a binary alloy (100%-x) Co(x)Fe, where x is between about 55% and about 75% by weight.* The term "anisotropic" is used in the present invention to denote a film exhibiting properties with different values when measured along axes in different directions. "To establish a prima facie case of obviousness of a claimed invention all the claimed limitations must be taught or suggested by the prior art" *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 44, 496 (CCPA 1970).

Kakuno, et al. investigated the structure, composition and morphology of $\text{Co}_x\text{Fe}_{1-x}$ alloys prepared on a copper substrate under potentiostatic electrodeposition conditions to produce composition modulated alloys. In Kakuno, et al., x is from 0 to 1. Applicants respectfully submit that Kakuno, et al. do not disclose a cobalt-iron binary alloy having the claimed features. Specifically, Kakuno, et al. do not disclose a cobalt-iron binary electroplated film having *a saturation magnetization of at least about 2.30 Tesla, which is substantially free of oxygen and iron oxide, and that the film is anisotropic.* These features of the claimed invention are not disclosed in the Kakuno, et al. article; therefore the claims of the present invention cannot be obvious over the disclosure of Kakuno, et al.

As is indicated and shown in the attached Declaration, Kakuno, et al. do not disclose or suggest applicants' claimed cobalt-iron binary alloy electroplated film having a saturation magnetization of at least about 2.30 Tesla, said film being substantially free of oxygen and iron oxide, anisotropic and consisting of a binary alloy (100%-x) $\text{Co}(x)\text{Fe}$, where x is between about 55% and about 75% by weight. In contrast to the claimed

films, the CoFe films of the prior art were shown in the Declaration to have a magnetic moment of 2.2 Tesla, which value is below the claimed range of at least 2.3 Tesla. Moreover, the prior art films contain oxygen as an impurity in an amount of 5.7 atomic %, which is above the claimed limitation of the inventive films. The data also generated shows that the prior art films had isotropic properties, not anisotropic, as presently claimed.

Mallory discloses a procedure of deposition a magnetic material onto a substrate while subjecting the magnetic material to a magnetic bias field in order to induce a anisotropic magnetic moment. Referring to Page 4 of the present Office Action, it is the Examiner's position that applying the magnetic field disclosed in Mallory to the composition and plating process disclosed in Kakuno, et al. would produce applicants' claimed cobalt-iron binary alloy electroplated film. Applicants disagree and submit the following.


Applicants submit that the applying a magnetic field, similar to that disclosed by the Mallory reference to the alloy film produced by the Kakuno, et al. process fails to disclose a *cobalt-iron binary alloy electroplated film which has a saturation magnetization of at least about 2.30 Tesla, is substantially free of oxygen and iron oxide, anisotropic and consisting of a binary alloy (100%-x) Co(x)Fe, where x is between about 55% and about 75% by weight as recited in amended claim 1*. Referring to Page 10 of the newly submitted Declaration, applicants disclose that applying a magnetic field to the alloy compositions produced by the Kakuno, et al. process results in an alloy film having a magnetic moment of 2.2 Tesla. Applicants note that 2.2 Tesla is below applicants' claimed range, as recited in amended Claim 1. Therefore, since it has been proven by the

newly submitted Declaration that applying a magnetic bias to the alloy films produced by the Kakuno, et al. process produce a magnetic moment that is less than applicants' claimed range; the applied references fail to teach or suggest each and every limitation of applicants claimed *cobalt-iron binary alloy electroplated film*, as recited in amended Claim 1.

In view of the above remarks and the experiments evidenced in the attached § 132 Declaration, applicants submit that the claims of the present invention are patentably distinguished from the combined disclosures of Kakuno, et al. and Mallary. Applicants thus respectfully request that the Examiner reconsider and withdrawal the rejections under 35 U.S.C. §103 that are based upon the disclosures of Kakuno, et al. and Mallary raised in the Office Action.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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Enclosures Declaration of Hong Xu
Exhibits 1-4